

Application No.: 10/055,545
Docket No.: JCLA6997

REMARKS

Present Status of the Application

The Office Action rejected all presently-pending claims 1-16. Specifically, the Office Action rejected claims 1-16 under 35 U.S.C. 103(a), as being unpatentable over Kim et al. (U. S. Patent 6,424,396) in view of Ikeno et al. (U. S. Patent 6,008,875). Applicants have amended claims 1, 7 and 10-16. After entry of the foregoing amendments, claims 1-16 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Summary of Applicant's Invention

The Applicant's invention is directed to a multi-domain vertical alignment liquid crystal display, having a substrate with a color filter, a liquid crystal layer and a thin-film transistor array substrate. The thin-film transistor array substrate has an array of thin-film transistors and pixel electrodes. The pixel electrodes have a plurality of protrusions and slits, and a dielectric layer with a planarized surface covering the pixel electrodes. Therefore, the dielectric layer on the protrusion is thinner. Or alternatively, the protrusions are exposed. The exposed protrusions being alternately arranged with the slits and the dielectric layer result in a planarization effect, and have the function of twisting the electric field generated by the pixel electrodes. The liquid crystal molecules are thus inclined towards different directions to divide the liquid crystal layer of the same pixel electrode into multi-domains.

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Discussion of Office Action Rejections

Applicants have amended claims 1, 7 and 10-16 to overcome the objections.

The Office Action rejected claims 1-16 under 35 U.S.C. 103(a), as being unpatentable over Kim et al. in view of Ikeno et al.. Applicants respectfully traverse the rejections for at least the reasons set forth below.

The present invention, as shown in FIGs. 4-5, has introduced the protrusions 309 and the slits 320, *so as to form multiple domains* in the pixel cells. Also and, the dielectric layer 322 provides the planar surface for the LC molecules. The features are recited in independent claim 1 as follows:

Claim 1. (Currently amended) A multi-domain vertical alignment liquid crystal display, comprising at least:

a first substrate, having a plurality of thin-film transistors, a plurality of protrusions and a plurality of pixel electrodes thereon, wherein the pixel electrodes formed over the protrusions have a plurality of slits, whereby the protrusions and the slits produce a multi-domain mechanism, and the first substrate further includes a planarized dielectric layer on the protrusions and the slits;

a second substrate; and

a liquid crystal layer disposed between the first substrate and the second substrate (*Emphasis added*).

Likewise, independent claim 10 recites the features as follows:

Claim 10. (currently amended) A thin-film transistor array substrate, comprising:

a substrate;

a plurality of thin-film transistors formed on the substrate to provide an electric field;

a plurality of pixel electrodes covering the protrusions and having a plurality of slits arranged with the protrusions to form multiple domains; and

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a dielectric layer, covering the pixel electrodes and the slits, the dielectric layer having a planarized surface(Emphasis added).

The features emphasized above in claims 1 and 10 are at least not disclosed by the prior art references.

The Office Action asserts that Kim et al. disclose the features of the present invention, with respect independent claim 1, except the planarized dielectric layer, and then cites Ikeno et al. to supply the planarized dielectric layer. Applicants respectfully disagree.

In re Kim et al., a step structure at the area C is clearly required (Fig. 2; col. 3, lines 12-17; col. 5, lines 13-17; and Abstract). The step portion is used to have quickly response to the generated electric field. Fig. 3 shows the mechanism. Also and, the step portion is necessary to be located between the first aperture P1 and the second aperture P2.

Therefore, *the step portion of Kim et al. is not specifically used with the apertures to produce multiple domains. In addition, the step portion is desired without planarization. In other words, Kim et al. do not expect a planar surface for the LC molecules.*

In re Ikeno et al., the level layer 9 is used to planarized the uneven electrode 6'. The uneven electrode 6' is due to the uneven substrate 5'. The uneven surface is used to only allow the frequency component of light in a specified direction to pass through the polarization plate 4 (col. 4, lines 31-36). Clearly, the uneven electrode 6' is not equivalent to the electrode with apertures in Kim et al. or the slits of the present invention. Further still, the uneven electrode 6' is not equivalent to the step portion of Kim et al. and the protrusions of the present invention.

Therefore, Applicants also want to assert that *the combination of Ikeno et al. with Kim et al. is not proper. If the combination is made, the level layer 9 of Ikeno et al. will destroy the*

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motivation of Kim et al. to have the step portion. Also and, since the issues considered by Kim et al. and Ikano et al. are different, it is either not obvious to apply the level layer 9 for the uneven electrode 6' in Ikano et al. to Kim et al.. The present invention is also non-analogous to Ikano et al. The combination of Kim et al. with Ikano is not proper.

Even if the level layer 9 is still improperly applied to Kim et al., since the step portion of Kim et al. are not used to produce the multiple domains of the present invention, the level layer 9 of Ikano et al. still failed to supply the missing features in Kim et al.

The same foregoing reasons are applied to independent claim 10.

For at least the foregoing reasons, Applicants respectfully submit that independent claims 1 and 10 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-9 and 11-16 patently define over the prior art as well.

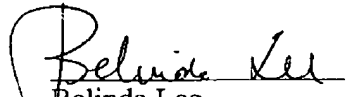
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CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims 1-16 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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